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Is Urodynamics necessary to test a patient with Male LUTS?

1. Background

Urodynamics can assess storage and voiding function in individual patients, to better understand mechanisms underlying lower urinary tract symptoms (LUTS). Storage function is assessed by measuring pressure during bladder filling, and may identify detrusor overactivity or increased filling sensation. Voiding function is assessed by measuring both pressure and flow. For many years, urologists have been undecided on whether urodynamics brings essential information, or whether a sufficient assessment can be achieved by clinical evaluation alone. Attempts to find non-invasive alternatives have not yet found an adequate approach [1]; the role of invasive urodynamics thus remains a key question in the care pathway for male LUTS.

2. Diagnostic assessment of a patient's voiding function

It is the voiding abnormality which is probably the principle question for urodynamics in male LUTS. Urodynamic testing identifies the generation of pressure, which is what distinguishes bladder outlet obstruction (BOO) from detrusor underactivity (DUA). BOO is identified by high pressure achieving only a slow flow rate [2], which is quantified with the BOO Index. DUA signifies low pressure generation as the explanation for the low rate of urine flow. It is characterised by a wandering and poorly sustained low amplitude detrusor contraction, with a low bladder contractility index (BCI). Fundamentally, the importance of measuring the BOO Index and BCI, and hence ascertaining BOO or DUA, is in deciding whether to recommend BOO-relieving surgery, such as TURP. DUA is present in 9-48% of men undergoing urodynamic evaluation for non-neurogenic LUTS [3], and so is potentially contributory for a large number of such patients.

3. Clinical and therapeutic implications

Surgery to relieve BOO should be done in circumstances where an improvement in voiding LUTS can be expected. If BOO is genuinely present, successful surgery should improve voiding. In contrast BOO surgery in a man who has DUA may well fail to improve that individual's LUTS [4, 5]. However, because there is no confirmed effective therapy available for DUA, surgeons quite often attempt intellectual arguments to justify

offering bladder outlet obstruction relieving surgery even when no BOO is present. These arguments in reality are conjecture. However, the implication if BOO surgery is undertaken is absolutely manifest to the patient, who faces the peri-operative period in the short-term, and any adverse effects in the long-term.

BOO is probably more likely to be present than DUA in most age groups of people potentially affected by BPE, but the relative prevalence is not clear epidemiologically [6]. There is a reasonable chance that basic clinical assessment not including urodynamic evaluation can give a reasonable indicator of whether a man has got bladder outlet obstruction. BOO is a well-recognised possibility in men as their prostatic enlargement progressively intrudes into the urethra. Unfortunately, there is no clinical point discernible by basic history or examination to be certain whether or not DUA is also present alongside BOO in a man, or whether DUA is the sole cause of an individual's voiding LUTS. Either BOO and/ or DUA can be present in healthy individuals. The EAU Guidelines suggest that comparatively young men or older men need to be considered for urodynamic testing [7], because of a suspected higher prevalence of DUA in these age groups. The guidance states that when considering surgery in men with bothersome predominantly voiding LUTS, pressure flow studies should be performed in men aged <50 years, and may be performed in men aged >80 years. The slightly different recommendations reflect the paucity of evidence on which to base conclusions [8, 9]. In men who are physically unfit or who suffer from a medical condition, DUA should probably be considered more seriously, though BOO may ultimately be present.

4. A patient perspective

Given the implications of having surgery, many patients are very definite in their desire to ensure that the best information is available to help their doctor decide what to recommend. Urodynamics is a comparatively straight-forward test able to discern genuinely whether a patient has got BOO, DUA, or perhaps even both. This represents a logical step when making a potentially life-changing recommendation of surgery to a patient. Omitting urodynamic testing and instead relying on an instinctive hunch that BOO is present is probably not best practice. The Urodynamics for Prostate Surgery Trial: Randomised Evaluation of Assessment Methods (UPSTREAM;

<https://clinicaltrials.gov/ct2/show/NCT02193451>) is a UK-based study of 820 men randomised to an assessment pathway in which the decision is based solely on clinical observations, or a pathway where urodynamic testing is included [10, 11]. When the study reports in late 2018, it will be a landmark step towards an appreciation of the many considerations that contribute to decision-making for male LUTS therapy.

Some doctors seem to think that patients “do not want urodynamics”. These doctors seem to be curiously blind to the fact that patients probably do not want TURP either, unless they can be confident of seeing improvement. Innately, surgeons perhaps may look favourably on surgical solutions for a patient’s symptoms, but morally there needs to be a clear expectation that the problem would have a realistic chance of improving with that surgery. For sure, the patients themselves have an expectation that the doctor will only recommend surgery if they genuinely believe that there is a realistic chance of improvement. The UPSTREAM study suggests that many individuals are willing to accept the short-term nuisance of urodynamic testing, given that it will give their doctor information to help make a sensible recommendation for a future intervention that for sure would affect the rest of their life (i.e. TURP or other options [12]). These men reckon that short-term discomfort from urodynamic testing might prevent lifelong issues resulting from the irreversible consequences of surgery.

5. Quality of testing

A fundamental expectation of urodynamic evaluation is that the test has to be done well and interpreted appropriately [13]. It is crucial that centres undertaking urodynamics for male LUTS understand properly how to calculate the BOO Index and the BCI, ensuring the pressure recordings are accurate, and that any artefact affecting the maximum flow rate is identified and corrected [14]. Unfortunately, urodynamic machines can report an erroneous BOO Index and BCI, as the software in these machines is not yet sufficiently advanced to discriminate between real patient pressures, and artefacts unavoidably introduced during the testing process. What this means is that simple acceptance of an automatic analysis of urodynamic curves by the urodynamic machine software should be avoided, as it might result in incorrect values leading to inappropriate conclusions and treatments. All centres need to ensure that their traces are scrutinized to check the

conclusions are plausible, and so make sure that the results reported are a genuine reflection of the patient's urinary function.

6. Assessing storage LUTS

The presentation of men with LUTS is often with urgency, increased daytime urination frequency or nocturia, i.e. storage LUTS. This is actually the main presentation driver for the majority of patients. Good care for patients indicates that the main bothersome symptoms should be the focus of assessment and therapy. However, urologists seeing a man with storage LUTS also need to enquire about voiding LUTS being present in addition. If they are present, the doctor may end up diverting the therapeutic pathway to focus on the voiding LUTS, even if it was storage LUTS that caused the patient to present. Somehow, the presenting complaint gets subordinated to the additional "less bothersome" symptoms. This can result in problems later on in the clinical course, and it is imperative that the medical profession retains a focus on the presenting symptoms for each individual patient. Urodynamics is probably less crucial in people with pure storage LUTS. These patients fundamentally require assessment with clinical evaluation (medical history and physical examination), urinalysis, completion of a bladder diary, and symptoms score [7].

7. Conclusions

Urodynamic testing brings a key aspect to patient evaluation which cannot be derived by any other means. It is the only way to be sure whether a man has BOO or DUA or both. Clinicians can have a good idea of the likelihood of diagnosis without it, but certainty only comes with pressure measurement alongside flow rate testing. The patient has to live with the consequences lifelong, and so genuine consideration is expected by all healthcare professionals. The lack of evidence in male LUTS as to the contribution of urodynamic testing should be effectively addressed when the UPSTREAM study reports.

Take home message

Urodynamics can distinguish bladder outlet obstruction from detrusor underactivity. Clear identification of the mechanism of a man's voiding symptoms can help give the

best chance of good outcome from surgery. Publication of results of the UPSTREAM study will help establish the exact place of urodynamic testing in male LUTS.

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